REMARKS

The following remarks are fully and completely responsive to the Office Action dated September 19, 2002. Claims 1-9 are pending in this application with claims 6-9 withdrawn from consideration. In the outstanding Office Action, claims 3 and 5 were rejected under 35 U.S.C. § 112, second paragraph, and claims 1-5 were rejected under 35 U.S.C. § 102(e). No new matter has been added. Claims 1-5 are presented for consideration.

35 U.S.C. § 112, Second Paragraph

Claims 3 and 5 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Specifically, the Office Action asserted that the term "may be" was not clearly defined. Applicant thanks the Examiner for his suggestion as to how to amend claims 3 and 5 to overcome this rejection. The above amendments to claims 3 and 5 incorporate the suggestion provided by the Examiner. Accordingly, claims 3 and 5 now particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Therefore, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 3 and 5 under 35 U.S.C. § 112.

35 U.S.C. § 102(e)

Claims 1-5 were rejected under 35 U.S.C. § 102(e) as being anticipated by Suyama et al. (U.S. Patent No. 6,055,255). In making this rejection, the Office Action asserts that this reference teaches each and every element of the claimed invention. Applicant respectfully requests reconsideration of this rejection.

Claim 1 recites a semiconductor laser. This laser includes an n-type clad layer and a p-type clad layer. An active layer is sandwiched by the n-type clad layer and the p-type clad layer. A current constriction layer for current confinement and light confinement consists of at least two layers which are disposed in either of the n-type clad layer and the p-type clad layer. A first layer of the current constriction layer closer to the active layer has a different conductivity type from a conductivity type of either of the clad layers in which the current constriction layer is provided and is made of a material having almost the same refractive index as the clad layer, which refractive index is smaller than that of the active layer. A second layer of the current constriction layer further from the active layer is made of a material having a smaller refractive index than the first layer.

Suyama discloses a semiconductor laser that has an oversaturated absorption layer (saturable absorbing layer 9). The semiconductor laser 100 disclosed in Suyama is formed by placing a clad layer 3 formed from n-$Ai_{0.5}Ga_{0.5}As$ formed on a buffer layer 2. On top of the clad layer 3 is formed an active layer 4. This active layer 4 is formed from $Al_{0.14}Aga_{0.86}As$. A second clad layer 5 formed from p-$Al_{0.5}GA_{0.5}As$ is formed on active layer 4. Etching stopping layers 6 and 8 are formed on clad layer 5. A first current blocking layer 9 is formed as a saturable absorbing layer from n-$Al_{0.14}Ga_{0.86}As$.

A second current blocking layer 10 is formed from n-$Al_{0.6}Ga_{0.4}As$ on current blocking layer 9. A protection layer 11 is provided on the second current blocking layer 10. A third clad layer 12 is formed from p-$Al_{0.5}Ga_{0.5}As$ on protection layer 11. Clad layer 12 is followed by a cap layer 13 and an electrode layer 14.

As shown in Figure 1, the first current blocking layer 9 is the closest current blocking layer to active layer 4. As disclosed in Suyama at column 6 beginning at line 53, the aluminum (Al) composition of the current blocking layer 9 and the active layer 4 are the same. Consequently, the refractive index (band gap) of the first current blocking layer 9 and the active layer 4 are quite similar.

As is well known in the art, reducing the aluminum composition increases the refractive index. Therefore, the refractive index of the first current blocking layer 9 is higher than the refractive index of the second clad layer 5, since the aluminum composition of the second clad layer is 0.5, which is higher than the aluminum composition of the first current blocking layer 9 of 0.14.

In Suyama, it is necessary to use the oversaturated absorption layer (first current blocking layer 9) with a refractive index similar to that of the active layer so that oversaturated absorption effects can be exhibited in the current blocking layer. These effects are recited in claims 3 and 5 of Suyama.

In contrast, claim 1 recites that the first layer of the current constriction layer closer to the active layer has a different conductivity type from a conductivity type of either of the clad layers in which the current constriction layer is provided and is made of a material having almost the same refractive index as the clad layer, which refractive index is smaller than that of the active layer. As discussed above, Suyama teaches that

the first current blocking layer 9 has a refractive index greater than the clad layer 5 or 12.

Therefore, Suyama fails to teach and/or suggest the present invention. Specifically, Suyama fails to teach and/or suggest a first layer of the current constriction layer closer to the active layer is made of a material having almost the same refractive index as the clad layer, which refractive index is smaller than that of the active layer. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection of claims 1-5 under 35 U.S.C. § 102(e).

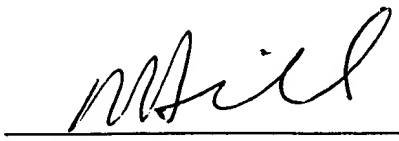
Conclusion

Applicant's amendments and remarks have overcome the rejections set forth in the Office Action dated September 19, 2002. Specifically, Applicant's amendments to claims 3 and 5 overcome the rejection of these claims under 35 U.S.C. § 112, second paragraph. Applicant's remarks have distinguished claims 1-5 from Suyama and thus overcome the rejection of these claims under 35 U.S.C. § 102(e). Accordingly, claims 1-5 are in condition for allowance. Therefore, Applicant respectfully requests consideration and allowance of claims 1-5.

Applicant submits that the application is now in condition for allowance. If the Examiner believes that the application is not in condition for allowance, Applicant respectfully requests that the Examiner contact the undersigned attorney by telephone if it is believed that such contact will expedite the prosecution of the application.

The Commissioner is authorized to charge payment for any additional fees which may be required with respect to this paper to our Deposit Account No. 01-2300, making reference to attorney docket number 107400-00026.

Respectfully submitted,



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Enclosures: Marked-Up Copy of Amended Claims
Petition for Extension of Time

MARKED-UP COPY OF AMENDED CLAIMS

Please amend claims 1, 3 and 5 as follows:

1. (Amended) A semiconductor laser comprising:

an n-type clad layer;

a p-type clad layer;

an active layer sandwiched by said n-type clad layer and said p-type clad layer; and

a current constriction layer for current confinement and light confinement consisting of at least two layers which is disposed in either of said n-type clad layer and said p-type clad layer,

wherein a first layer of said current constriction layer closer to said active layer has a different conductivity type from a conductivity type of either of said clad layers in which said current constriction layer is provided and is made of a material having almost the same refractive index as said clad layer <u>which refractive index is smaller than that of said active layer</u>, and

wherein a second layer of said current constriction layer farther from said active layer is made of a material having a smaller refractive index than said first layer.

3. (Amended) The semiconductor laser of claim 2, wherein said stripe trench is formed so as to have an inclined surface with respect to a width-direction of said current constriction layer, so that a width of said stripe trench for injecting current provided in said first layer [may be] <u>is</u> smaller than a width of said stripe trench provided in said second layer.

5. (Amended) The semiconductor laser of claim 2, wherein said stripe trench in said first layer and said stripe trench in said second layer are provided in different steps, so that the width of said stripe trench provided in said first layer [may be] is smaller than the width of said stripe trench provided in said second layer.

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